

PATENT ABSTRACTS OF JAPAN

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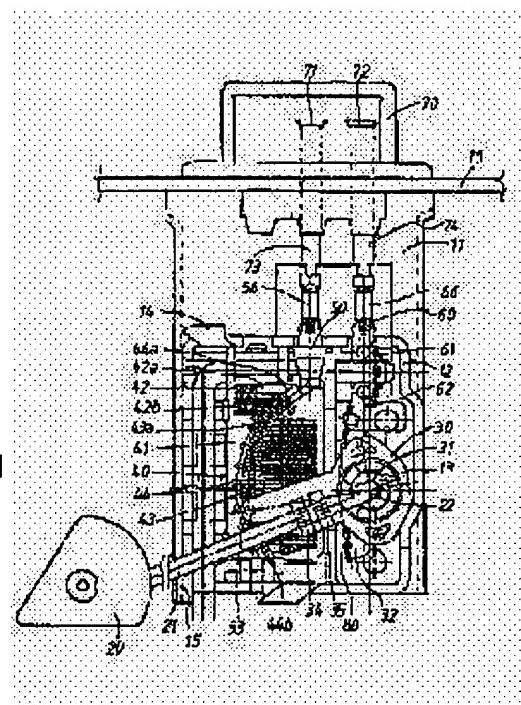
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(54) LIQUID LEVEL DETECTOR

(57)Abstract:

PURPOSE: To enable connection of one end part of a terminal to a resistance plate by pressure welding while the other end part of the terminal is allowed to be connected to an external circuit by caulking.

CONSTITUTION: This detector is provided with a float 20 interlocking to changes in a liquid level, resistance patterns 42 and 43 and a resistance plate 40 printed with a conductor pattern 44 connected to the resistance patterns 42 and 43, a contact 33 of a metal plate 32 fixed on the rear of a yoke 30 sliding on the conductor pattern 44 interlocking changes in the float and a terminal 50 for connecting one end 42a of the resistance pattern 42 to an external circuit. One end of the terminal 50 has a contact part electrically contacting the end 42a of the resistance pattern 42 by a spring elasticity and the other end of the terminal 50 has a caulked part 56 at which a connector terminal plate 73 extending from the external circuit is connected electrically by caulking.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] Especially this invention relates to the oil-level detection equipment which detects fluctuation of an oil level as change of electric resistance with respect to oil-level detection equipment.

[0002]

[Description of the Prior Art] Conventionally, as oil-level detection equipment which detects fluctuation of an oil level as change of electric resistance, the thing as shown in drawing 3 and drawing 4 is known, for example. It is equipped with drawing 3 in the gas tank of an automobile, the front view of the oil-level detection equipment which detects the oil level in this gas tank is shown, and drawing 4 shows the important section sectional view of drawing 3. In drawing 3 and drawing 4, bearing is prepared in housing 100 at one, and it is made as [insert / the edge of the bending section 112 of the 111 float-arms edge which equipped the bearing hole 101 of this bearing with the float 110 at that tip].

[0003] After the bending section 112 of a 111 float-arms edge is inserted in the bore 131 prepared in York 130 made of resin, the float arm 111 has fixed to York 130 with the pawls 132 and 133 for stops. A plate 134 (refer to drawing 4) is fixed to York 130 and one by the rear face of this York 130, it gets down to it, and the contact 135 is formed at the tip of this plate 134. Moreover, the resistance plate 140 is being fixed to housing 100, this resistance plate 140 can be burned on the ceramic substrate 141 in the conductor pattern 144 connected to the resistance patterns 142 and 143 and these resistance patterns 142 and 143, and it is made as [slide / on this conductor pattern 144 top / a contact 135].

[0004] Here, if the oil level in a gas tank falls to the location of an oil level A to the oil level B, along with the fall of an oil level, float 110 will move caudad. A contact 135 slides on a conductor pattern 144 top caudad with migration in the lower part of this float 110. It follows on a contact 135 sliding on a conductor pattern 144 top caudad, and the resistance of the resistance plate 140 increases gradually and the external circuit which is not illustrated is made as [report / information means, such as a display which is not illustrated, / the fall of an oil level].

[0005]

[Problem(s) to be Solved by the Invention] By the way, in above-mentioned oil-level detection equipment, as shown in drawing 3 and drawing 4, the resistance pattern 142 and the external circuit (not shown) are connected through a terminal 150 and lead wire 160. And the connection between the resistance pattern 142 and a terminal 150 arranged the tip bending section 151 of a terminal 150 in contact with the upper part of the resistance pattern 142, and has made [it makes it enter it and] and soldered solder 155 between the resistance pattern 142 and the tip bending section 151. However, in order to have soldered the resistance pattern 142 and the tip bending section 151, the process of soldering was needed and the problem that working efficiency was bad and became a cost rise was produced.

[0006] On the other hand, the connection between a terminal 150 and an external circuit has soldered the other end 152 of a terminal 150, and the lead wire 160 which extends from an external circuit with

solder 162. However, when the other end 152 and lead wire 160 of a terminal 150 were soldered, when tensile force was given to lead wire 160, stress joined solder 162, and the problem that solder 162 carried out a creep rupture was produced.

[0007] In order to prevent the creep rupture based on the stress of this solder 162, it projected from housing 100, claw parts 163 and 164 were formed, and the device to which clamp lead wire 160 2 or 3 times, and it is made for stress not to join solder 162 by these claw parts 163 and 164 was made.

However, since it was necessary to project from housing 100, to form claw parts 163 and 164, in order to make it stress not join solder 162, and to clamp lead wire 160 2 or 3 times to claw parts 163 and 164, the activity clamped while components increase increased, working hours became long, working efficiency fell, and the problem of becoming a cost rise was also produced.

[0008] Then, it is not necessary to solder by making this invention in view of the above-mentioned trouble and, the terminal end section and a resistance plate can be connected with a pressure welding, and the other end and the external circuit of a terminal aim at offering oil-level detection equipment connectable [with a caulking].

[0009]

[Means for Solving the Problem] This invention is oil-level detection equipment which detects fluctuation of an oil level as change of electric resistance. The 1st description on the configuration of this invention The float interlocked with fluctuation of an oil level, and the resistor which has two or more electric contacts, The plate which is interlocked with fluctuation of a float and slides on the electric contact top of the plurality of this resistor, It is in having the terminal which connects a resistor and an external circuit, the end of this terminal having the contact section which contacts a resistor electrically with spring elasticity, and the other end of this terminal having the caulking section which connects in total the conductor which extends from an external circuit to this conductor electrically.

[0010] Moreover, the 2nd description on the configuration of this invention is for the above-mentioned terminal to have formed the caulking section in this horizontal level while having the ramp which inclines in the upper part from the end of the contact section, the vertical section which falls from this ramp to right under, and the horizontal level which extends horizontally from the lower limit of this vertical section. Moreover, the 3rd description on the configuration of this invention prepares the bending section between an above-mentioned ramp and a vertical section, and is to have given spring elasticity to the contact section by this bending section. Moreover, the 4th description on the configuration of this invention is for an above-mentioned resistor to have the printing resistance which printed the resistance pattern on the front face of the substrate which has insulation. Moreover, the 5th description on the configuration of this invention is in what was stopped by the supporter of the stanchion which inserted into the abbreviation center section of the above-mentioned vertical section, formed the section, and formed this insertion section in housing holding a resistor, and one.

Furthermore, the 6th description on the configuration of this invention is to have used phosphor bronze or beryllium copper as an ingredient of an above-mentioned terminal.

[0011]

[Function and Effect of the Invention] In this invention constituted as mentioned above, the end and resistor of a terminal contact electrically with spring elasticity, and are that the other end of a terminal and the conductor which extends from an external circuit can connect a resistor and an external circuit electrically, without soldering in order to connect electrically by the caulking.

[0012] Moreover, a terminal forms the caulking section in this horizontal level while having the ramp which inclines in the upper part from the end of this terminal, the vertical section which falls from this ramp to right under, and the horizontal level which extends horizontally from the lower limit of this vertical section. And if the bending section is prepared between a ramp and a vertical section, it becomes possible to give big spring elasticity to the end of the terminal which contacts a resistor certainly, and will contact electrically by contact resistance with small resistor and end of a terminal.

[0013] Moreover, since accurate resistance is acquired while the stable resistance is acquired, since the resistor is formed by printing resistance which printed the resistance pattern, it becomes possible to detect change of an oil level correctly, without producing an error. Furthermore, since phosphor bronze

or beryllium copper is used as an ingredient of a terminal, powerful spring elasticity can be given to the end of the terminal in contact with a resistor.

[0014]

[Example] Subsequently, the example of this invention is explained based on drawing. Drawing 1 is drawing showing one example of the oil-level detection equipment of this invention, and drawing 2 is the sectional view showing the important section. In drawing 1 and 2, the bracket 11 fixed on the background of the flange 10 which closes opening of the gas tank which is not illustrated, and the housing 12 made of synthetic resin has fixed to this bracket 11 on it. This housing 12 has prepared the bearing which is not illustrated in one, and the edge of the bending section 22 of the 21 float-arms edge which equipped the bearing hole 13 of this bearing with the float 20 at that tip is inserted. Moreover, the stanchions 14 and 15 of the pair prolonged in the same direction as the bearing hole 13 in housing 12 are formed in one.

[0015] The bore 31 for inserting the bending section 22 of a 21 float-arms edge and the pawls 34 and 35 for stops for fixing a float arm 21 are formed in York 30 made of resin. And the bearing hole 13 is made to penetrate the bending section 22 of a 21 float-arms edge, and York 30 is made to hold with the stanchions 14 and 15 of the pair prepared in housing 12, enabling free predetermined include-angle rotation.

[0016] Moreover, the metal plate 32 is fixed to this York 30 and one by the rear face of York 30 made of resin, and it is in it. The contact 33 is formed at the tip of this plate 32, and the other end of a plate 32 is connected to the negative side terminal 72 of a connector 70 through the spring 80 and the terminal 60.

[0017] The resistance plate 40 used as a resistor is fixed to housing 12, and this resistance plate 40 can be burned in the conductor pattern 44 connected to the resistance patterns 42 and 43 and these resistance patterns 42 and 43 on the ceramic substrate 41, and is made as [slide / on this conductor pattern 44 top / the contact 33 of a plate 32]. Here, a conductor pattern 44 can be called two or more electric contacts. End 42a of the resistance pattern 42 of the resistance plate 40 is connected to the forward side edge child 71 of a connector 70 through the terminal 50. Moreover, other end 42b of the resistance pattern 42 is connected to end 43a of the resistance pattern 43 through the conductor pattern 44.

[0018] Here, if float 20 moves caudad along with the fall of an oil level, with migration in the lower part of this float 20, it will move caudad also in York 30 and the contact 33 of the plate 32 fixed to the rear face of York 30 will slide on a conductor pattern 44 top caudad. It follows on a contact 33 sliding on a conductor pattern 44 top caudad, and follows on the contact 33 of a plate 32 sliding on other end 44b of a conductor pattern 44 from end 44a of a conductor pattern 44, each resistance of each resistance patterns 42 and 43 is added serially, and it is made as [increase / resistance].

[0019] a terminal 50 and a terminal 60 -- conductivity and spring elasticity -- good -- and a caulking -- being easy -- copper alloy ingredients, such as the copper alloy ingredient for springs, for example, phosphor bronze, and beryllium copper, are used. And a terminal 50 has the contact section 51 in contact with end 42a of the resistance pattern 42, the ramp 52 which inclines in the upper part from this contact section 51, the vertical section 54 which falls from this ramp 52 to right under, and the horizontal level 55 which extends horizontally from the lower limit of a vertical section 54, and forms in a horizontal level 55 the caulking section 56 which closes the connector terminal assembly 73 which extends from a connector 70. Here, the bending section 53 is formed between the ramp 52 and the vertical section 54, and big spring elasticity is certainly given to the contact section 51 by this bending section 53.

[0020] Break 54a of the shape of a portal which is not illustrated is prepared in the center section of the vertical section 54, by pushing the center section of the break 54a section of the shape of this portal, insertion section 54b is formed and this insertion section 54b is made as [stop / by attaching part 16a of housing 12 and the stanchion 16 formed in one]. On the other hand, the terminal 60 has the connection object 62 connected to the other end of a plate 32, the weld zone 61 welded, and the caulking section 66 which closes the connector terminal assembly 74 which extends from a connector 70.

[0021] moreover, it forms in a connector 70 from the connector terminal assemblies 73 and 74 which extend, respectively from the connector terminals 71 and 72 and each of these connector terminals 71 and 72 of a pair for connecting with the external circuit which is not illustrated, and the slit which is not

illustrated prepares in the center of each point of each of these connector terminal assemblies 73 and 74 - - having -- **** -- each point -- two forks -- it is formed in the **. thus, each point of each connector terminal assemblies 73 and 74 -- two forks -- the caulking of each caulking sections 56 and 66 of a terminal 50 and a terminal 60 becomes easy by forming in a **.

[0022] In this example constituted as mentioned above, the end 51 of a terminal 50 contacts end 42a of the resistance pattern 42 electrically with spring elasticity, and is that the caulking section 56 and the connector terminal assembly 73 of the other end of a terminal 50 can connect the resistance plate 40 and an external circuit electrically, without soldering in order to connect electrically by the caulking.

[0023] Moreover, a terminal 50 has the ramp 52 which inclines in the upper part from the end 51 of this terminal 50, the vertical section 54 which falls from this ramp 52 to right under, and the horizontal level 55 level from the lower limit of this vertical section 54. And since the bending section 53 is formed between the ramp 52 and the vertical section 54, it becomes possible to give big spring elasticity to the end 51 of the terminal 50 in contact with the resistance plate 40, and will contact electrically by contact resistance with small resistance plate 40 and end 51 of a terminal 50.

[0024] Moreover, since accurate resistance is acquired while the stable resistance is acquired, since the resistance plate 40 is formed by printing resistance which printed the resistance patterns 42 and 43, it becomes possible to detect change of an oil level correctly, without producing an error. Furthermore, since phosphor bronze or beryllium copper is used as an ingredient of a terminal 50, powerful spring elasticity can be given to the end 51 of the terminal 50 in contact with the resistance plate 40.

[0025] In addition, although it extends from the connector terminals 71 and 72 of a connector 70 and the connector terminal assemblies 73 and 74 were formed, it replaces with the connector terminal assemblies 73 and 74, and you may make it use lead wire in an above-mentioned example. Moreover, although the contact section 51 which contacts end 42a of the resistance pattern 42 with spring elasticity was formed only in the terminal 50, you may make it prepare the contact section which contacts the connection object 62 with spring elasticity also in a terminal 60 in an above-mentioned example.

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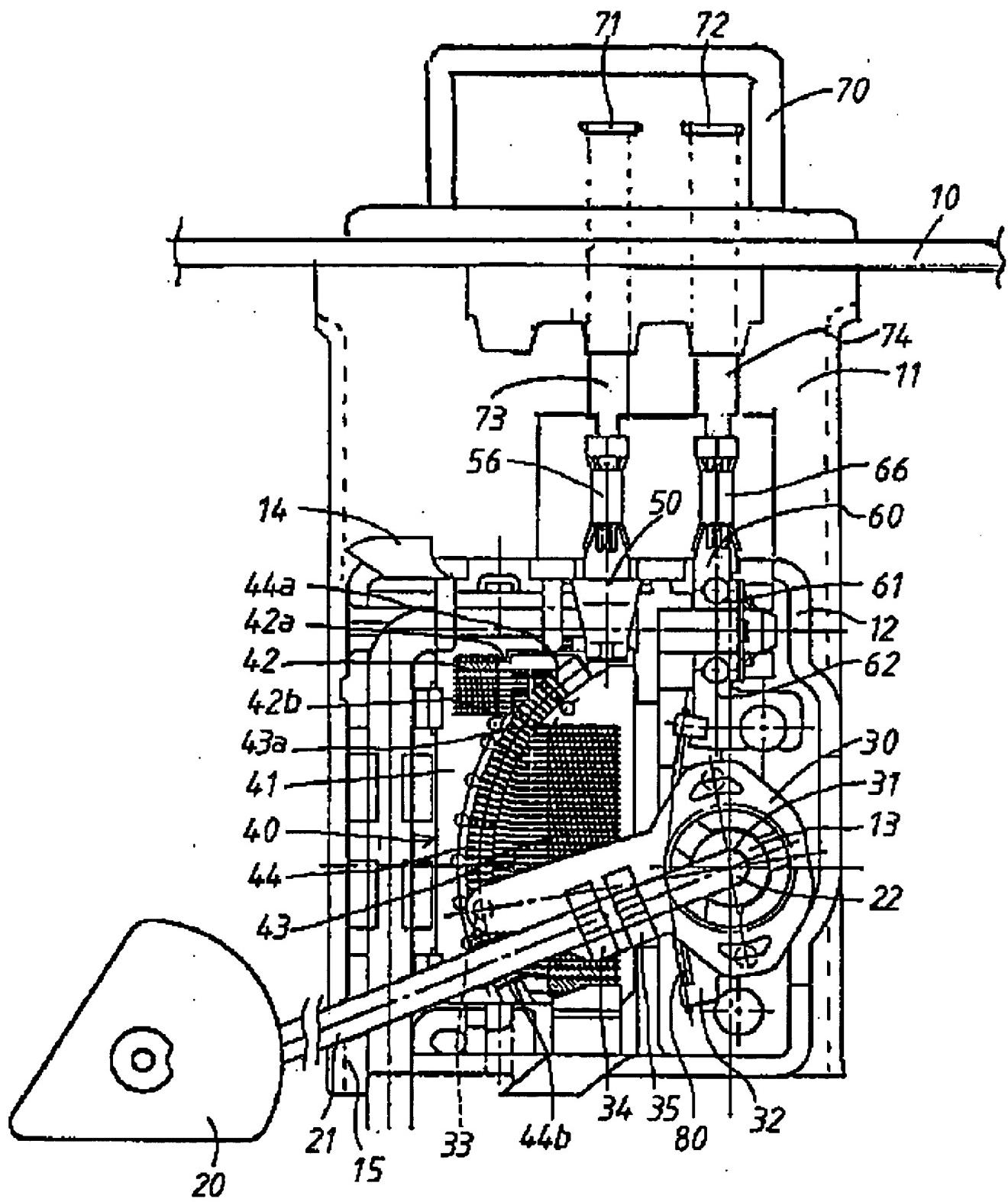
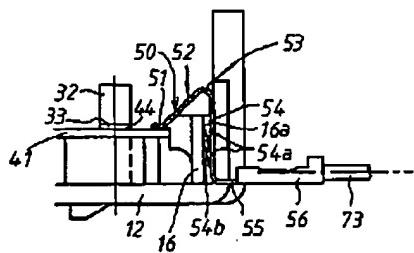


Fig. 1

Drawing selection drawing 2



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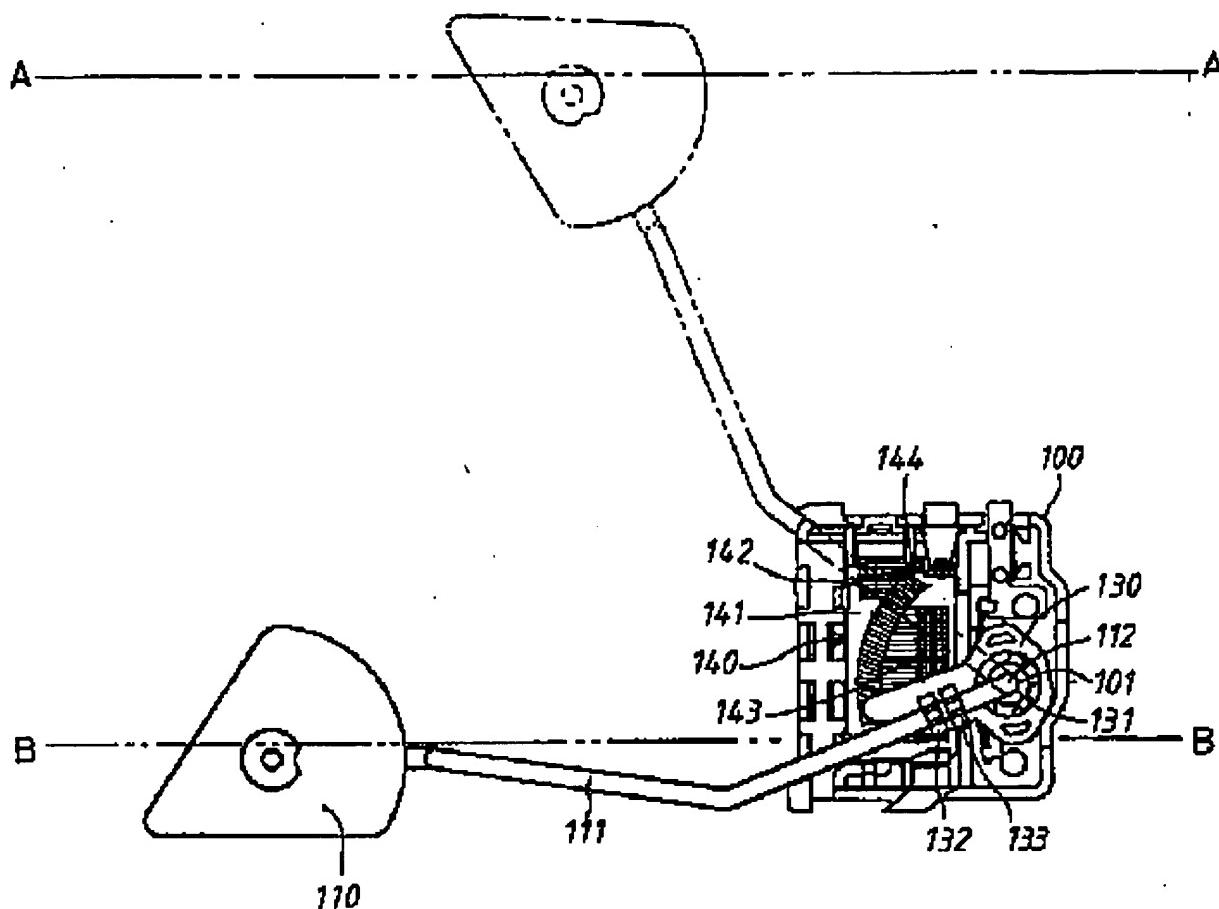
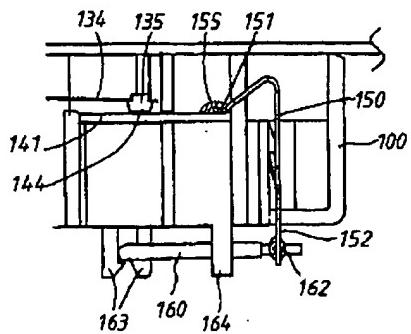


Fig. 3

Drawing selection drawing 4



[Translation done.]